
Adult Respiratory Emergencies:

Severe Acute Respiratory Syndrome



Note Well:

As of December 3, 2003 the majority of patients identified as having SARS have been between the ages of 15-80 years, some of whom were previously healthy. Persons infected with the SARS virus have included persons providing care to patients with SARS before their arrival at hospitals, as well as after their admission to hospitals. Few confirmed patients with SARS infection have been children < 15 years of age. The case-fatality rate, according to the World Health Organization, increases sharply with age:

0-24 years: 1%
25-44 years: 6%
45-64 years: 15%
Over 64: 50%

The incubation period for SARS is 2-10 days. Initial clinical features of SARS are nonspecific. The illness begins generally with a prodrome of fever ($>100.4^{\circ}\text{F}$ [$>38.0^{\circ}\text{C}$]). Fever often is high, sometimes is associated with chills and rigors, and might be accompanied by other symptoms, including headache, malaise, and myalgia. At the onset of illness, some persons have mild respiratory symptoms. Dry cough is common, although other symptoms of upper respiratory tract infection are unusual. Typically, rash and neurologic or gastrointestinal findings are absent; however, some patients have reported diarrhea during the febrile prodrome.

After 3-7 days, a lower respiratory phase begins with the onset of a dry, nonproductive cough or dyspnea, which might be accompanied by or progress to hypoxemia. In 10%-20% of cases, the respiratory illness is severe enough to require intubation and mechanical ventilation.

Physical signs on chest examination are minimal. In early stages, SARS may be hard to differentiate from other viral infections, and diagnostic delays may contribute to the spread of the epidemic. Early diagnosis relies on suspected or known contact with a person believed to have had SARS or history of travel to an area of documented transmission.

The case-fatality rate among persons with illness meeting the current WHO case definition of SARS is approximately 3%.

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I. All Provider Levels

1. Refer to the Patient Care Protocol.
2. Refer to Section IV and follow all appropriate infection control procedures



Note Well: *Any time the provider suspects a patient may have the SARS virus they are to don protective gear. Providers should be acutely aware during flu season or if a SARS case is reported in the metropolitan area.*

3. Provide 100% oxygen via NRB. If respiratory effort is inadequate assist ventilations utilizing BVM with 100% oxygen.
4. Place the patient in position of comfort. If evidence of poor perfusion is present place the patient in shock position.
5. Initiate advanced airway management with Combi-tube for the respiratory arrest patient.



Note Well: *EMT-I and EMT-P should also use the combi-tube to help prevent the aerosolized transmission of the SARS virus.*

6. Establish an IV of Normal Saline KVO in cases of altered mental status and/or signs of shock.
 - A. Administer 250 cc bolus, reassess patient
 - B. If patient remains hypotensive, continue boluses to a total of 1000 cc.
7. Obtain and record patient's temperature

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II. Advanced Life Support Providers

1. Attach EKG and interpret rhythm.
 - A. Refer to the appropriate protocol to treat any arrhythmias that may be present.
 - B. Attach EKG to patient care report

III. Transport Decision

1. General considerations
 - A. Suspected SARS patients should be transported using the minimum number of EMS personnel and without non-SARS patients or passengers in the vehicle.
 - B. Receiving facilities must be notified prior to arrival of suspected SARS patients to facilitate preparation of appropriate infection control procedures and facilities.



Note Well: *IF the Department of Health designates certain hospitals as SARS Assessment Centers, these patients should be transported there.*

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IV. Infection Control

1. General
 - A. In addition to respiratory droplet and possible airborne spread, SARS may be transmitted if residual infectious particles on environmental surfaces are brought into direct contact with the eyes, nose or mouth, e.g., by unwashed hands. Therefore, hand hygiene is of primary importance for all personnel working with possible SARS patients.
 - B. Protective equipment should be used throughout transport of a suspected SARS patient.
 - C. Personal activities (including: eating, drinking, application of cosmetics, and handling of contact lenses) should not be performed during patient transport.
2. Protective equipment and procedures
 - A. Disposable, non-sterile gloves must be worn for all patient contact.
 - B. Gloves should be removed and discarded in biohazard bags after patient care is completed (e.g., between patients) or when soiled or damaged.

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IV. Infection Control (continued)

2. Protective equipment and procedures (continued)
 - C. Hands must be washed or disinfected with a waterless hand sanitizer immediately after removal of gloves.
 - i. Hand washing waterless hand sanitizer should be performed a second time after removing all PPE, including gloves, gowns, eye-protection and N-95 respirator.
 - ii. A key concern is that the SARS-virus might become attached to the external surface of the N-95 respirator that an EMS provider is wearing and then by unconsciously touching the outside of the N-95 with bare hands, a person could infect themselves when they next touch their eyes, or nose, or mouth. The N-95 might be removed most prudently by the two straps *without* touching the front of the N-95 respirator where the SARS-virus may have been deposited.
 - D. Disposable fluid-resistant gowns should be worn for all direct patient care.
 - E. Gowns should be removed and discarded in biohazard bags after patient care is completed or when soiled or damaged.
 - F. Eye-protection must be worn in the patient-care compartment and when working within 6 feet of the patient. Corrective eyeglasses alone are not appropriate protection.
 - G. N-95 (or greater) respirators should be worn by personnel in the patient-care compartment during transport of a suspected SARS patient; personnel wearing respirators should be fit tested.

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IV. Infection Control (continued)

2. Protective equipment and procedures (continued)

- H. The door/window between driver and patient compartments should be closed before a suspected SARS patient is brought onboard. N-95 (or greater) respirators should be worn by the driver if the driver's compartment is open to the patient-care compartment. Drivers that provide direct patient care (including moving patients on stretchers) should wear a disposable gown, eye-protection, and gloves as described above during patient-care activities. Gowns and gloves are not required for personnel whose duties are strictly limited to driving.
- J. Vehicles that have separate driver and patient compartments and can provide separate ventilation to these areas are preferred for transport of possible SARS patients. If a vehicle without separate compartments and ventilation must be used, the outside air vents in the driver compartment should be open, and the rear exhaust ventilation fans should be turned on at the highest setting during transport of SARS patients to provide relative negative pressure in the patient care compartment.
- K. Oxygen delivery with non-rebreather facemasks may be used for patient oxygen support during transport.
- L. The patient may wear a paper surgical mask to reduce droplet production, if tolerated.
- M. Positive pressure ventilation should be performed using a resuscitation bag-valve mask, preferably one equipped to provide HEPA or equivalent filtration of expired air.

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IV. Infection Control (continued)

2. Protective equipment and procedures (continued)
 - N. Cough-generating procedures should be avoided during pre-hospital care (e.g., nebulizer treatments).



Note Well: *Nebulizers should be given as indicated in patients that are wheezing or in respiratory distress.*

V. Mechanically Ventilated Patients

1. EMS organizations should consult their ventilator equipment manufacturer to confirm appropriate filtration capability and the effect of filtration on positive pressure ventilation.
2. Mechanical ventilators for SARS-patient transport should provide HEPA or equivalent filtration of airflow exhaust.

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VI. Waste Disposal

1. Dry solid waste, e.g., used gloves, dressings, etc., should be collected in biohazard bags for disposal as regulated medical waste in accordance with local requirements at the destination hospital.
2. Waste that is saturated with blood, body fluids, or excreta should be collected in leak-proof biohazard bags or containers for disposal as regulated medical waste in accordance with local requirements at the destination hospital.
3. Sharp items such as used needles or scalpel blades should be collected in puncture resistant sharps containers for disposal as regulated medical waste in accordance with local requirements at the destination hospital.
4. Suctioned fluids and secretions should be stored in sealed containers for disposal as regulated medical waste in accordance with local requirements at the destination hospital. Handling that might create splashes or aerosols during transport should be avoided.
5. Suction devices should be fitted with in-line HEPA or equivalent filters in accordance with manufacturer's recommendations.

VII. Cleaning and Disinfection

1. Compressed air that might re-aerosolize infectious material should not be used for cleaning the vehicle or reusable equipment.
2. Non-patient-care areas of the vehicle should be cleaned and maintained according to vehicle manufacturer's recommendations.
3. Personnel performing cleaning should wear non-sterile gloves, disposable gowns eye-protection and the N-95 respirator while cleaning the patient-care compartment.

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VII. Cleaning and Disinfection (continued)

4. Patient-care compartments (including stretchers, railings, medical equipment, control panels, and adjacent flooring, walls and work surfaces likely to be directly contaminated during care) should be cleaned using an EPA-registered hospital disinfectant in accordance with manufacturer's recommendations.
5. Spills of body fluids during transport should be cleaned by placing absorbent material over the spill and collecting the used cleaning material in a biohazard bag. The area of the spill should be cleaned using an EPA-registered hospital disinfectant. Cleaning personnel should be notified of the spill location and initial clean-up performed.
6. Contaminated reusable patient care equipment should be cleaned and disinfected promptly after use and before returning to service.
7. Personnel should wear non-sterile gloves, disposable gowns face shields and the N-95 respirator while cleaning reusable equipment.
8. Reusable equipment should be cleaned and disinfected according to manufacturer's instructions.

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VIII. Follow-up of EMS Personnel who Transport suspected SARS Patients



Note Well: *If there is at least one patient with suspected SARS in the DC area, personnel involved in the transport of any patient with respiratory symptoms and fever should measure their own temperature twice a day, morning and evening, for ten days following the transport. (Some Toronto paramedics got infected with the SARS virus at the very beginning of the epidemic there in March 2002)*

1. At the conclusion of the transport, all providers who may have been exposed are to complete the proper exposure form and forward it to the Infection Control Officer.
2. Personnel may continue working during the 10 day post-exposure period provided the following criteria are met
 - A. They have no symptoms of fever or respiratory illness.
3. Personnel who have transported a suspected SARS patient and develop symptoms of SARS within the 10 day post-exposure period should be directed to seek medical evaluation and should report this to the Infection Control Officer.
 - A. The Infection Control Officer will then notify the following
 - i. Director, Department of Health
 - ii. Bureau of Communicable Disease Control (BCDC)
 - 202-442-9131 or 202-442-5842 or 202-442-9371
 - After Hours 202-727-6161
 - B. Return to duty must approved by the Infection Control Officer and the Medical Director.